

## **Green Curriculum : Sustainable Learning at a Higher Education Institution**



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### **Abstract**

The United Nations (UN) constituted 2005–2014 as the decade for educational sustainable development when bridges have to be built between academic institutions and their communities. In this article I will therefore do a literature search from 2005–2011 on what it means to be a sustainable university with a sustainable curriculum by looking at case studies from other higher education institutions in order to begin to give guidelines for such an endeavour in an open and distance learning (ODL) institution. Thereafter I will focus on recommendations on how to transform present study material into a green curriculum by using a qualification in Human Settlements as a case study.

**Keywords:** Human settlements; sustainability; transformation; green curriculum; resilience; ecological footprint

## Introduction

The current global energy and environmental crisis, the possible impact it might make on future generations, the fact that energy demand is increasing, and oil prices that have risen steadily have brought the demand for more efficient buildings, homes, cars, and consumer products to the fore. Coburn, a partner at Price Waterhouse Coopers, states: "the growing demand for environmental products and services could translate into one of the biggest new markets in recent memory" (Coburn, 2008, p. 1).

The United Nations (UN) has also constituted 2005–2014 as the decade for educational sustainable development. This decade speaks to the bridges that must be built between academia and the needs of the community as well as the need to enact sustainability in higher education in order to positively affect the larger society and biosphere (UNESCO, 2006).

UNESCO (2006) has identified four main goals in order to achieve this, of which the second speaks directly to education:

Rethinking and revising education from nursery school to university to include a clear focus of current and future societies on the development of knowledge, skills, perspectives and values related to sustainability. This means reviews of exiting curricula in terms of its objectives and content to develop transdisciplinary understandings of social, economic and environmental sustainability and recommended and mandated approaches to teaching, learning and assessment. (p. 56)

Higher education has a critical role to play in producing sustainable students by helping them to understand "the complex connections and interdependencies between the environment, energy sources, and the economy" (Elder, 2009). Elder further states:

The education required to accomplish this is a new way of thinking and learning about integrated, systemic solutions not just to the economic and environmental challenges but also the interdependent health, social and political challenges. Above all, this new way of thinking uses the green economy as the focal point for understanding the deep connections between economics, energy, the environment and social well-being, often referred to as *sustainability*. (p. 108)

Universities, according to Togo (2009, p. 22), are considered to have three missions, namely teaching, research, and community services. He is of the opinion that they still serve this role in modern society but where traditionally universities were predominantly for the elite they can now be valuable if they are also involved in

community service. Universities are therefore tasked to critically engage with values in order to produce students who can play a role in seeking solutions to societal problems.

Togo (2009, pp. 61-63) has studied universities worldwide on the issue of sustainability in education and the lessons he learnt are (summarised) as the following:

- The impact of the environment should be the primary concern in all university decision making processes and students should be part of this;
- An environmental management system provides important opportunities for lecturers and students to engage with issues on sustainability;
- A university that follows an environmentally friendly path enhances its public image, attracts and retains committed staff, and reduces consumption and therefore saves money; and
- Including environmental issues in existing qualifications as well as having distinct qualifications in which the content is uniquely environmental and sustainable is a better approach as lecturers will not feel as if they are working beyond the parameters of their disciplines.

I agree with Togo (2009, p. 32) when he says it is important for higher education to redefine sustainability locally "...because sustainable development problems crucial to developing countries are different from those of developed nations." In this article I will use the terminology *green curriculum* and *sustainability* interchangeably as the word 'green' is used as 'go green' and the word 'sustainability' to capture the connections and integration of an interdisciplinary curriculum. Furthermore I will do a literature search from 2005–2011 on what it means to be a sustainable university with a sustainable curriculum by looking at case studies from other higher education institutions in order to begin to give guidelines for such an endeavour in an ODL institution. Thereafter I will focus on recommendations on how to transform present study material into a green curriculum by using a programme in Human Settlements as a case study.

## Sustainable Learning at a Higher Education Institution

The present United States president, Barack Obama, said at the United Nations summit (Kanter, 2010) that it is imperative that we act now to create a sustainable future: "Our generation's response to [the challenge of climate change] will be judged by history, for if we fail to meet it – boldly, swiftly, and together – we risk consigning future generations to an irreversible catastrophe."

Higher education in America, according to Elder (2009, p. 108), is beginning to do its part; to date, 650 colleges and universities have signed a Climate Commitment and they are working towards development plans to make their campuses climate-neutral. For

example, largely as a demand from students, the higher education sector is now the largest purchaser of wind energy in the United States. Many other education institutions in America have made sustainability one of their guiding principles and top priorities, yet similar changes to the curriculum (according to Elder, 2009) are lagging behind.

The emerging local academic field that is focussing on sustainability should address complex problems which will lead to important future implications. Brundiers, Wiek, and Redman (2010, p. 309) state: "These kinds of problems, which most often manifest as a conglomerate of problems, call for sophisticated solutions and extensive problem-solving processes...by using systems-thinking, anticipatory, normative and strategy-building methods..." They go further by giving the following guidelines to identify real-world learning opportunities (2009, p. 312):

Address the actual sustainability challenges in your own community; provide students with the opportunity to apply the methods and concepts they learned in their studies; give academic supervision with the collaboration of the local community and business to develop a robust solution to the problem; and strive to produce workable contributions to solutions in order for the students to understand the impact this will have on the world.

Wals (2010, p. 380) agrees with this as he says: "Universities in particular have a responsibility in creating space for alternative thinking and emergence of new ideas, as well as in critically exploring old ones." He is of the opinion that it is the task of higher education to appreciate and utilize differences amongst students because social interaction allows them to relate their ideas to others which may lead them to rethink their ideas with alternative and contesting viewpoints. Wals (2010, p. 387) says: "At the same time (learning) experiences which are shared with others, are likely to gain importance....giving the learner a sense of competence and belonging to the community of learners."

Wals (2010, p. 387) further argues that another component of sustainability is to cope with uncertainty: "...educational spaces should build a culture of learning awash with uncertainty and in which uncertainty provokes transformative yet precautionary commitment rather than paralysis." Togo (2009, p. 34) agrees with this as he is of the opinion that the concept of resilience is increasingly being used in sustainable development. I agree with both the previous researchers. As discovered from personal experience in an ODL environment, a resilient problem-solving student can become an employable graduate who is also an asset to his or her community.

Aina (2009, p. 23) summarises the above opinions when he says, "Higher education contributes to the formation and development of human capital, the cultural and social construction of values and meaning, and the capacity for individual and collective emancipation from ignorance to domination." However we might wonder how far are

we locally with this endeavour? The demand for sustainability here in South Africa has created the development of new careers in the green industry, such as solar panel installers and wind turbine technicians, and the “greening” of all other employment from construction to business management, but how far are we locally in designing our curricula to create the sustainable future of which President Obama speaks?

Coburn (2008, p. 2) states that Siemens has accepted the challenge when they declare: “Our mission is to help our customers manage their buildings’ energy costs, improve reliability, and enhance performance while having a positive impact on the environment.”

Locally, Rhodes University has drawn up a Community Engagement Policy with the following objectives:

promotion of community service in relation to working with the community towards a better future; generating graduates who have a sense of civic responsibility; and promoting learning which benefits the community as well as provides students with the opportunity to apply theory to local, regional and national development issues. (Rhodes University, 2005)

This university therefore has a range of environmental and sustainability programmes which are offered by the science and education departments.

An ODL institution does not have a residential campus as the students reside at a distance. They therefore belong to various communities and it might be necessary to set special guidelines for sustainable learning in such an institution.

## Preliminary Guidelines for Sustainable Learning in an ODL Institution

The University of South Africa (Unisa), one of the largest open and distance learning institutions, makes the following pledge in their charter on transformation: “Institutional change entails the reconfiguration of systems, processes, structures, procedures and capabilities to be expressive of transformational intent.” They go further by saying that they must find innovative ways of enriching the student experience by incorporating alternative knowledge canons (Unisa, 2011).

Wals (2010, p. 380), states that “in a post-modern world the search for sustainability is marinated in uncertainty and poorly defined situations with diverging norms, values, interests and reality construction.”

Cummings (2010, pp. 38-40) tries to set institutional criteria for high-performance in sustainability by suggesting the following four steps: infusion of green concepts in the curriculum; focus on workforce development and 'green jobs'; research and development related to renewable energies; and promotion of environmental principles in the operations and facility management of the institutions.

Cummings goes further by placing integrity at the centre of institutional initiatives in sustainability (2010, p. 60), which might be the exact same thing Unisa wishes to accomplish by having all staff and students sign their charter on transformation. Cummings (2010, p. 133) found in his study of sustainability at different intuitions that the following might contribute to achieving the above outcomes:

strong commitment by top leaders; leveraging administrative and human resource powers; celebrating milestones and acknowledging success; building and supporting faculty and student interests; building philanthropic support; and integrating sustainability into the curriculum.

Hope and Cook (2009) agree with Cummings and add that that a collegial culture is important and the traditional divisions between academic disciplines should be broken down. Brundiers, Wiek, and Redman (2010, p. 310) summarised the literature by giving three key sustainability competencies:

the **strategic** knowledge cluster, clusters past developments, creates future scenarios and sustainable visions which deals with the competency of diverse opinions; the **practical** knowledge cluster deals with the competency of linking knowledge with action; and the **collaborative** cluster which involves the competency to work in teams.

Hopkinson and James (2009, p. 368) asked a group of 30 United Kingdom experts about the challenges they had in implementing their framework on sustainability. The results are summarised as follows:

Social aspects were seen as the main challenge; the most important responsibility was raising awareness; the most prominent task was modelling and evaluating performance; the highly regarded skill was in dealing with complexity; the best educational approach was case studies and role play; and the best measure of effectiveness was evidence of a wider perspective.

Unisa's position on sustainability is that the targets of sustainable development should be met (United Global Compact, 2011, p. 7).

It is therefore essential that Unisa responds to these issues through its core functions. Unisa has consciously elected to infuse sustainability into its business model. This includes teaching and learning, research, postgraduate education and community engagement. While teaching and scholarship must begin to reflect on sustainability related issues, students must be taught to learn to think in a more integrated manner.

Although all of the above opinions are not specifically for an ODL institution, it can shine some light on how one should go about in creating sustainable learning at such an institution. This needs to be researched further before a green curriculum can be designed.

## Sustainability at an African ODL Institution

The scale of the student numbers in an ODL institution (e.g., Unisa) means that ODL students are a crucial target for 'greening' sustainable initiatives, not only in their homes but also in their communities. Hopkinson and James (2010, p. 366) state:

This aims to increase student awareness about linkages between their subject and sustainable development; the potential impact and contribution their activities can make to this achievement; and the development of competencies that they can carry forward in their careers where they have the potential to make significant differences to people and the planet.

The question remains, how do we direct African universities away from European society with its unique sustainability challenges and root them in local social structures, which have their own unique challenges? Unisa's enrolment figures for 2010 show that the 293,437 registered students are dispersed across 28 countries. African students are dispersed across the African continent, mainly within the Southern African Development Community (SADC) region.

The United Nations (UNEP, 2008) is of the opinion that the African ecosystem and socioeconomic system are highly vulnerable to the impacts of climate change. The livelihoods of people are therefore threatened by typical challenges known to the African environment. This, according to Togo (2009, p. 37), includes climate change, deforestation, over-exploitation of resources, deterioration of marine and coastal ecosystems, and water quality issues as well as problems with poverty, food insecurity,

war, HIV/AIDS, environmentally related diseases, drought, water supply, and sanitation problems. Togo further states (2009, p. 37-39) that these sustainable challenges are compounded by a low capacity for responding to environmental challenges due to a lack of economic development, poverty, disease, and high population density. Countries in Africa do not meet the human development threshold of 0.8 and most have ecological footprints lower than 1.8. Notable is the fact that the 19 countries with the lowest human development index are in sub-Saharan Africa.

The Department of Environmental Affairs and Tourism (Togo, 2009, p. 39) released a discussion document for sustainable development in South Africa, which tried to address sustainability challenges in general, but according to Togo it was more orientated towards socioeconomic inequities and it 'glossed over' environmental issues. The second draft of the document, according to Togo, however outlined the sustainable challenges we have in South Africa; they are

a high and increasing ecological footprint; increasing pollution; unsustainable exploitations of natural resources; declining water quality; land degradation; unmet basic needs; unemployment; inequality; and increasing levels of poverty which reinforce direct dependency on natural resources and make the poor more vulnerable to water and air pollution.

The above document should therefore be the resource for an ODL curriculum by engaging students from Africa in ways that inspire them to not only become leaders in general, but also to exhibit excellence in learning pathways when dealing with the challenges that confront their own survival on this continent. Sustainability initiatives from the institution's side should therefore provide students with the knowledge, attitudes, and skills to become better citizens in their own communities.

## Preliminary Guidelines for a Sustainable Curriculum

The Ubuntu Declaration (UNEP, 2006), an initiative from education and scientific organisations all over the world, raised the following areas where universities have a role to play:

review programmes and curricula in order to address the challenges of sustainable development; strengthen the role of teachers and attract young people to the profession; develop mechanisms to keep teachers informed; and promote knowledge transfers in innovative ways in order to bridge the gaps and inequalities of present knowledge. (p. 67)

In Europe (Togo, 2009, p. 64) and in the United States (as previously mentioned) various courses of action have been taken towards curricular greening, and the following topics were proposed for sustainable development: atmosphere and climate; transport systems and fuel sustainability; agriculture, conventional and organic farming; ecological economics; tourism and sustainability; and urban physical environments.

In South Africa we also have to take notice of two international trends before embarking on the circulation of local qualifications, namely

- the triple bottom line trend, that is people, planet and profit, must be taken into consideration (Goethe institute, 2008); and
- the societal shift from focussing on learning rather than teaching (Wals 2010).

A local institution's position on a sustainable curriculum should be to model sustainable practises: "It is therefore important that academics and institutions keep experimenting with, and sharing their efforts to embody sustainability, especially in making it a focus of their disciplines and professions in the process of curriculum design, development and research" (United Global Compact, 2011, p. 7).

## Human Settlements as a Case Study

Human Settlements as a new qualification came about because according to research from Professor Kobus van Wyk from the Nelson Mandela Metropolitan University the affordable housing project of the government did not make the necessary impact and therefore a 'green-collar' position of manager in human settlements arose (Van Wyk, 2009, p. 1). The University of South Africa (Unisa), because it is an ODL institution which can reach many students and communities in Africa, was approached by government to consider this new qualification in order to bridge this gap.

The problem space was first defined as a tremendous shortage of individuals with the right skills; specifically, they have to know how an affordable house can be built and how to interact with the powers that be in making such a project sustainable in terms of the planet, people, and profit. The students will not only have to learn how to manage a process, but should also have sufficient knowledge in order to negotiate with building contractors, municipalities, lawyers, and workers. This curriculum therefore will be transdisciplinary in nature, including collaborative group work, community services, experiential education, ecological footprinting, reflective practise, and participatory decision-making.

It was necessary to once again consult the literature on what is done globally with this problem space. Hopkins and James (2010, pp. 74-82) had a similar case study and had the following recommendations:

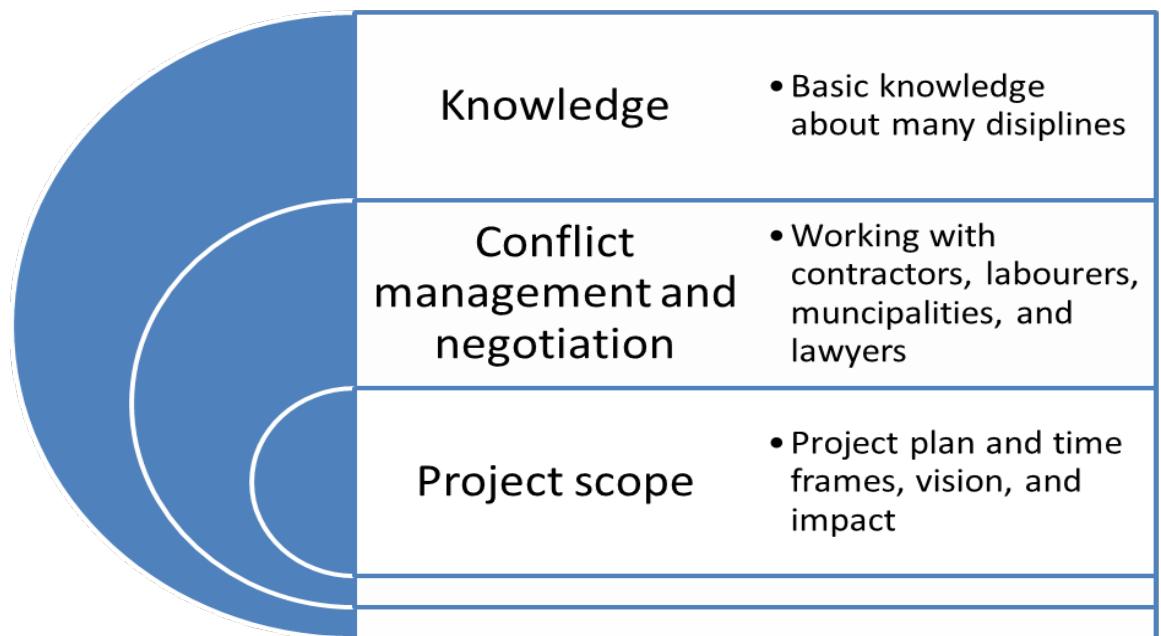
1. Use head, hands and heart as a holistically organising principle by integrating learning processes rooted in the students' heads, hands and hearts. Heads: knowledge. Hands: physical labour such as building and painting. Hearts: values, behaviour, learning communities with individual and group responsibilities.
2. Relate pedagogies: Study different epistemologies and implement them in order to enable transdisciplinary and experiential placed-based learning.
3. Map the pedagogical landscape in order to ensure transformational learning happens.
4. Analyse the sustainability of the qualification to see if it meets the learning outcomes.

Bacon et al. (2010, p. 194) agree with this and are of the opinion that a holistic framework will encourage students to look for solutions in the social, cultural, ecological, and political spheres of life; however, they are of the opinion that it requires careful examination of social and environmental needs in contrast to narrowly defined solutions. Some problems might require innovation in engineering while others suggest social innovation and/or changes in daily routines. They are adamant that interdisciplinary learning is very challenging, and problem-based learning with an all-inclusive project overview might be the answer to these problems.

Brundiers, Wiek, and Redman (2010, pp. 319-320) state that real-world learning opportunities can align well with key competencies in sustainability, but they warn such opportunities need to incorporate three principles to be effective: collaborative design; coordination, where the opportunities build on one another; and integration of general introductory modules because students are usually unfamiliar with real-world learning, so they need to be introduced to those models, methods, and tools.

In a project like Human Settlements, lecturers tend to fall back on the knowledge and the content they already have to design a new curriculum for a new qualification, but because of the interdisciplinary nature of this qualification this could not happen and the literature and the problem space once again had to be considered first.

## Implementation of a Sustainable Human Settlements Qualification



*Figure 1.* Suggested curriculum for a human settlements qualification.

A human settlements manager must be a “Jack of all trades,” who has enough knowledge, the appropriate skills, the vision, and the quality assurance for the project to be successful; therefore, the following curriculum was suggested for this qualification in order to ensure that sustainable learning would take place.

**Knowledge:** basic knowledge of many disciplines such as basic building construction; water conservation and recycling; energy conservation; solid waste; biodiversity; demographic issues such as land acquisition and management; finance, cost and purchasing of cost-effective materials; designing business plans; environmental education; history of settlements; geographical issues; social issues such as crime, poverty, HIV/AIDS, joblessness; contracts with municipalities and legal matters that need to be considered with such contracts.

**Conflict management and negotiation:** people skills, a vision for the project, and above all conflict management and problem-solving skills.

**Project scope:** project plans, scope, and time frames as well as quality assurance, evaluating afterwards if the job was well done.

All of the above was considered as important for this curriculum, but according to the literature (discussed earlier) one should always keep the planet, people, and profit in mind. The focus should be on the learning aspect and according to the literature this can only be sustainable if each of the three fields of study is taught through real-world problems and through problem-based learning experiences.

An example of a real-world problem, as a problem-based learning experience, would be for the students to go to their own communities or nearby low-income settlements and consult with the people living there about the challenges they endure every day. A list of these problems should then become the project scope and plan. Research should be done with business partners and institutions such as the Council for Scientific and Industrial research (CSIR). Possible solutions should then be sought in consultation with these stakeholders. The budget and the consultations should be documented at all times, from the start through the project to the final assessment of achievement.

The curriculum designer of this qualification took all of the above guidelines into consideration and settled on the following purpose statement:

The purpose of this qualification is an academic orientated formative and transdisciplinary qualification which equips graduates with the knowledge base, theory and methodologies of Public Administration, Human Settlements Management and various functional areas. The degree will enable students to demonstrate initiative and responsibility in an academic and professional context and will equip them with critical thinking and problem solving competencies in the public and in private sectors as well as non-governmental organisations, in the field of human settlements management. With these skills and competencies, graduates will be able to understand, manage and administer human settlements projects and activities to successful completion. (Unisa Academic Management System)

Only time will tell if a comprehensive university such as Unisa will succeed in reaching the above goals and will be able to name this as a sustainable qualification where sustainable learning has taken place.

## Conclusion

The above case study shows that universities should rethink their way of designing curricula, not look at content first, and not view existing study material as sufficient to cut and paste into a curriculum of the 21<sup>st</sup> century. Wals (2010, pp. 387-388) states:

“Our search for a more sustainable world requires cutting edge new thinking that can break the cycle of unsustainable knowledge creation and transfer unsustainable technological development and unsustainable consumption patterns tied to unsustainable economic principles.” Wals further advises universities to break this pattern by questioning and reforming deeply entrenched routines, structures, and practises by taking advantage of the privileged position they have in society to transform social learning in order to cultivate a learning environment that mirrors real-world problems and becomes ‘learning for being’ or learning for future living.

Togo (2009, p. 131) agrees with Wals on real-world problems as case studies, but warns that the following challenges should be taken into consideration before embarking on such a path: not improving practice; not making available the data of success stories; not including information in the theoretical approach; and being grounded in a single institution.

He advises (drawing from Yin, 2003) that the following is important: a theoretical basis where research questions are described; triangulation is ensured by using multiple sources of evidence; a chain of evidence with traceable reasons and arguments are fully documented; and a comprehensive report is compiled in the end.

The theme of this new qualification in Humans Settlements is one of public outreach where the students’ own communities become the problem space. An ODL institution should consequently go beyond a curriculum that fits all by allowing individuals to solve their own problems in their own communities through radical problem-solving initiatives and transformative ideas that are imaginative and holistic in nature, to not only be profitable, but also to save the people and the planet.

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